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REPORT ON INTERROGATION OF
ALFRED MUCHE.

Attached is a report on the interrogation of Alfred MUCHE, of HAW 7 IV, carried out at Herford on 10th-11th November 1949 by Mr. R.G. Pendered and Wg. Cdr. F. Butler. The report concerns German work on Allied speech privacy systems. For a previous interrogation on this subject, see TICOM/I-203.

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REPORT ON INTERROGATION OF ALFRED MUCHE

Born: 7th January, 1903, BERLIN.
Address: BERLIN-CHARLOTTENBURG, Niebuhrstrasse 69a.
Profession: High Frequency Engineer.
Present Occupation: Berlin distributor for a glucose firm.

PERSONAL HISTORY

School: Real Gymnasium, up to Mittlere Reife.
1922-1924: Technische Privatschule, Dr. WERNER, BERLIN.
1925-1927: Technical development with the firm, RADIOG, BERLIN.
1927-1937: Ingenieur with HELIOWATT WERKE (NORA Radio).
1937-1945: Engineer with the HEERESWAFFENAMT, BERLIN, Intelligence Branch, German "Y" Service - short title, HWA 7 IV (c)

Duties:

The development of special radio equipment on behalf of the German High Command. Head of the Sub Section was Dr. Herbert LOTZE, assisted by Alfred MUCHE (Subject of this interrogation), and Hermann SCHONE. The terms of reference of the Sub Section were (from 1937 onwards):-

(a) To check the security of German privacy telephone systems.

(b) To investigate foreign (Allied) privacy/secrecy systems.

Narrative.

MUCHE's main occupation from 1937 until about 1940 was the general study of domestic and foreign speech secrecy/privacy systems. Foreign systems were mostly elementary and of the systems used or proposed by the Germans none was considered to give any real security. He mentioned in particular a system invented by the GEMA company, which he had solved very quickly; as a result production had been stopped.

2. At the end of 1940, or the beginning of 1941, the attention of MUCHE's party, Referat e, was drawn to some unintelligible speech transmissions on the Transatlantic telephone circuit. The person concerned was a Baurat SALZBRUNN. MUCHE himself listened to these transmissions and realised at once that single sideband working was being employed. The Germans had apparantly done little work on S.S.B. receivers and MUCHE visited Prof. KOOMANS of the Dutch P.T.T. for advice. Largely under MUCHE's direction S.S.B. receivers were then built, and records made at NORDWYK, Holland. Parallel work was also done by the Reichspost at their station in BIELITZ.

3. The records were studied by MUCHE's party, Referat e, and played back through an invertor. A few words were distinguished and it was found that intelligibility was improved by selecting particular bands of the spectrum by means of filters. Further analysis was done with a frequency analyser which split the speech spectrum into 24 or 25 bands each 100 c.p.s. wide and recorded mechanically the presence or absence of signal in each individual band. The analyser was later improved to show amplitude - amplitude and exact frequency could be measured, if necessary, with a microscope. Use was also made of an optical analyser, adapted by LOTZE from a device mentioned in Philips Review in connection with the Philips-Miller Recording System.

4. Using the frequency analyser it was at once obvious that the speech.

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spectrum was being split into 5 bands, inverted and translated. The two lower frequency bands were experimentally mixed until intelligible speech was obtained after which each subsequent section was put into its correct position. It was found that the cypher controlling the switching repeated cyclically after 36 sections. As far as MUCHE can remember these 36 switching keys were never changed.

5. A descrambling machine known as the 5B was built, largely under MUCHE's direction. It was originally a simple switching system driven by a synchronous motor which enabled partially intelligible signals to be obtained.

6. At the end of 1942, after some difficulty with the Reichspost who, according to MUCHE, became meddlesome, the equipment was moved from NORDWYK to LUDWIGSFELDE where there was already a large Army Monitoring Station.

7. MUCHE said that as far as he could remember the 5B apparatus first functioned operationally at about the time of the Sicily landings (1943). He was told of a conversation between CHURCHILL and ROOSEVELT which foreshadowed these landings and as a consequence the High Command were able to save themselves considerable losses by withdrawing to the mainland.

8. At the end of 1943 the station at LUDWIGSFELDE including the 5B equipment was totally destroyed by bombs. MUCHE was instructed at once to build another and after 8 months' work a second, much improved, 5B was made and installed, this time in a concrete bunker. In addition to improved switching gear and filters the second model also made provision for 8-band switching since this had been mentioned in an intercepted conversation between technicians over the Transatlantic telephone.

9. The new 5B was operational from the summer of 1944 until the military situation demanded a withdrawal from LUDWIGSFELDE. Early in 1945 MUCHE broke his arm and went into hospital. When he came out the 5B equipment and its operating personnel were on the march and MUCHE says that he never caught up with them. Of the ultimate fate of the equipment or the men he says that he knows nothing.

10. After the war was over MUCHE opened a small electrical business in the Russian zone. Then in October 1947 he was arrested by the Russians and put into prison. His treatment varied; after some time in solitary confinement he was given better quarters and better food and an attempt was made to pursuade him to work for the Russians. This he refused but after further incarceration he finally agreed as it appeared the only way in which he could get out of prison. He was released in November 1948 and as soon as possible made his way to Berlin. He now works in the British Sector as sole agent in Berlin for a firm manufacturing glucose.

11. MUCHE says that while he was in prison his premises were searched and some of his electrical equipment abstracted; but there was nothing of Sigint interest involved. He was interrogated by a Russian engineer, who was so ignorant, however, that nothing of importance was elicited.

Intelligence.

12. MUCHE says that he knows practically nothing about the intelligence derived from breaking the Transatlantic telephone system -- with the exception of the item about the Sicilian invasion mentioned above; this was clearly a "hand-out" to encourage their efforts. Although he is very vague about dates, it appears that cover was complete from about the summer of 1943 until the 5B was destroyed at the end of the year; and thereafter from about mid 1944 to the end. He is probably being truthful about the intelligence gained (he speaks no English); he assumed that the value of the information was considerable

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because high priority was given to the building of the second 5B apparatus and also he was offered the Kriegsverdienst Kreuz and a Speer Reward of 10,000 marks.

13. He mentioned during conversation that in 1940 messages dealing with the insurance of ships at Lloyds had been read and valuable information concerning shipping movements had been deduced.

Equipment.

14. The S.S.B. receivers were largely built to MUCHE's own instructions, parts by A.E.G. at OBERSCHOENEWEIDE. Ring modulators were at first supplied by SIEMENS but later "Star" modulators (STERNMODULATOREN) were developed by A.E.G., apparently to circumvent patent difficulties.

15. The numerous filters required for the 5B apparatus were perfected and supplied by a DR. VIERLING who ran a large laboratory for the authorities at a place called BAMBERG in southern Germany. VIERLING was also engaged on many other projects including the development of VHF receivers and transmitters.

16. On the speech analysis side BREUSING TONSYSTEM, BERLIN supplied most of the equipment - the PHILIPS-MILLER recorder and the mechanical writing-heads for the 24-band frequency analyser.

Russian Systems.

17. MUCHE himself never worked on Russian systems but he stated that they were first recorded and worked on in 1944 by a party headed by LOTZE. In February 1945 MUCHE was visited in hospital by LOTZE who told him that the Russian system had been broken and that basically it was a TIGERSTEDT system (= TDS) with wobble inversion. MUCHE could not remember, or was never told, the number of TIGERSTEDT heads involved; he thought it might have been seven. He did not know the period of the TIGERSTEDT key, or even if it had one.

MUCHE's own ideas.

18. MUCHE stated that in prison he hit upon a new idea for a speech secrecy system. He at first refused to disclose any details without some form of quid pro quo, but gave the following answers to general questions:

(a) The band width would remain the same as that of the clear speech but the signal would be so treated that the characteristic speech harmonics would no longer be recognised.

(b) There would be a time-delay between speaking at one end and hearing at the other similar to the TIGERSTEDT system.

(c) No synchronising signal would be necessary.

(d) The size of the equipment would be about the same as an S.S.B.receiver.

(e) The switching would be a combination of mechanical and electronic.

(f) It would probably be possible to mount the equipment in a truck.

(g) There would be a basic key, (e.g. time constants, frequency bands etc.) and a running key which might be controlled by film, perforated tape or wheels.

19. When pressed a little further he finally said that the principle of "speech stretching" was involved. The speech spectrum was to be divided into 5 slices and each slice stretched to fill the whole speech band. This, he claimed, would obliterate the harmonic properties of speech. The 5 slices were then to be scrambled by a TIGERSTEDT (Time delay switching) device controlled by a changing key. How the 5 slices each filling the whole speech band were to be transmitted in the time normally occupied by 1 slice MUCHE did not explain.

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20. He said that the system was still only an idea but he considered that he could produce a working prototype in about 6 months if given the necessary facilities.

MISCELLANEOUS.

21. MUCHE said that he had never heard of the VOCODER. Neither did he know anything about pulse communication, either in theory or in practice.

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APPENDIX 'A'

PERSONALITIES MENTIONED BY Alfred MUCHE

BUCZKOWSKI, BERLIN-TEMPELHOF, Attilastrasse 30 (?) (Now Deutscheherold)	N.C.O. Photographer, attached to Sub Section 'e'. Believed to have been interrogated by British in 1947.
COMANS, Professor See KOOMANS	
HEUSZLER, Ing.	Technician in charge of operational use of 5B equipment at NORDWYK and LUDWIGSFELDE.
KLUTH	Ing. with BREUSING TONSYSTEM, BERLIN. Co-operated in making optical speech frequency analyser.
KORN	An assistant operating the 5B equipment.
KOOMANS, Professor	(1942) Central Laboratories of Dutch P.T.T. Den Hague, HOLLAND.
LOTZE, Herbert, Dr. Ing.	Born in DRESDEN. Studied in HANNOVER. Aged (1949) about 40 years. In nominal charge of Sub Section 'e' of HWA 7 IV. Developed and patented Optical Speech Frequency Analyser. Believed to have been interrogated by British in 1947.
MARINIOK	Reichspost Telegrapheninspektor.
MUCHE, Alfred BERLIN-CHARLOTTENBURG, Niebuhrstrasse 69a.	Subject of this interrogation. High Frequency Engineer. Born 7th Jan.1903. Development engineer (with SCHONE) of 5B equipment. Imprisoned by Russians for 13 months.
SCHONE, Hermann	Development engineer of 5B equipment with MUCHE.
VIERLING, Dr.	Possibly Professor in H.F. at Tech.University (THS) HANNOVER. Set up a laboratory on behalf of German Supply Ministry, near BAMBERG, S.Germany, where the filters for the much improved 5B were made. Also believed to have developed VHF Receivers and Transmitters.